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ABSTRACT

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A direct write process and apparatus for fabricating a desired circuit component onto a substrate surface of a microelectronic device according to a computer-aided design (CAD). The process includes (a) providing a support member by which the device is supported while being fabricated; (b) providing a chamber for containing a precursor fluid material under a substantially constant pressure differential relative to the ambient pressure, with the precursor fluid material having a viscosity no less than 10 cps; (c) operating an inkjet-based dispensing head with a control valve or actuator for dispensing and depositing minute droplets of the precursor fluid material onto the substrate surface; (d) energy- or heat-treat the deposited precursor fluid material for converting it to the desired active or passive component; and (e) operating a machine controller for generating control signals in response to the CAD coordinates for controlling the position of the dispensing head relative to the support member in response to the control signals to control dispensing and depositing of the precursor material to form the desired component. The process is useful for depositing a wide range of component materials onto an electronic device, including conductor, resistor, capacitor, dielectric, inductor, antenna, solar cell electrode, battery electrode, interconnect, superconductor, sensor, and actuator element materials.